Enduring Transmission Charging Arrangements for Distributed Generation

National Grid Electricity Transmission plc

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Electricity Charging and Access Development

Industry Meeting

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Structure

- The Problem (National Grid perspective)
- The Options
- National Grid preferred way forward

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The Problem - National Grid Perspective

All generation has an effect on transmission flows

EG within +ve generation TNUoS charging zones can reduce local demand, but may increase flows south

Transmission constraint

Power flow south

Similarly, EG within negative generation TNUoS charging zones may reduce flows south

GSPs do not have to be exporting to affect transmission

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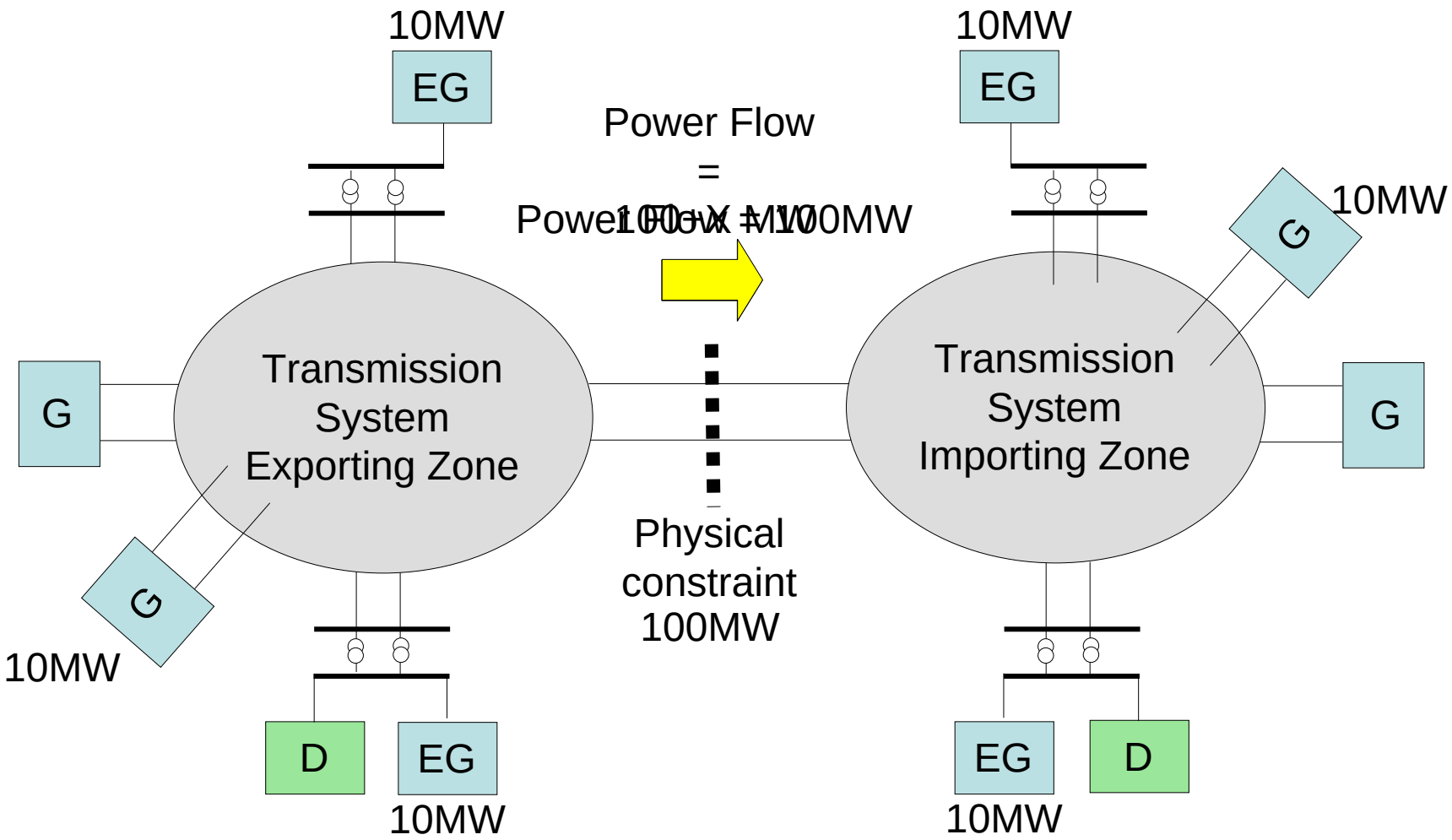
Impact of Embedded Generation



Impact is the same as transmission connected 10MW

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The Problem - National Grid Perspective

- All generation has an effect on transmission flows
- Previously, volumes of distributed generation have been too small and dispersed to be significant for transmission
  - 100MW threshold set by DTI
  - Generation below this threshold treated as negative demand
- Government policy now encouraging new generation much of which is embedded:
  - ROCs
  - DNO incentives
- Unlicensed EG forecast to grow from 7GW to 10GW by 04/07
  - National Grid making huge investments for generation that may not be seeing a properly cost reflective transmission charge

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Requirements on National Grid

- Licence Conditions
  - Facilitate competition
    - level playing field
  - Cost reflective charging
    - Incentives to embed should be cost reflective
  - Reflect developments in transmission
    - BETTA, government policy, DNO incentives
  - No undue discrimination
    - Transmission charges must be consistently applied
- Ability to demonstrate efficient investment
  - User commitment

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Transmission Issues

- Lack of transmission rights
  - directly connected generators have TEC
  - who is exporting onto transmission from GSPs?
    - The embedded generator/ DNO/ Supplier?
- Operational and commercial control of exporting GSPs
- Unlicensed EG not exposed to costs of location decisions
  - EG in Scotland seeing same transmission cost as directly connected generator in the South of England
- Complexities in contractual framework
  - BELLAs and BEGAs
  - 132kV connected generators

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How is this resolved?

- Time is right to review present arrangements
- Important to consider rights as well as charges
- Consistently apply transmission charges across generation, not just to licensable and directly connected generation (e.g. those above 100MW)

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Options (1)

- Option 1 - Do Nothing
  - Not consistent with present situation
  - CAP093 is not a solution
- Option 2 - De-energise spilling plant
  - De-energisation should be action of last resort
  - Not practical - needs a commercial solution
- Option 5 - Reduce 100MW threshold
  - Helps, but to what level, and how justified?
  - Incentive to structure projects below threshold
  - Everyone to contract with National Grid?

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Options (2) - Charging Model Tweaks

- Option 3 - Improve modelling of the 132kV in the DC load-flow (DCLF) Investment Cost Related Pricing (ICRP) charging model
  - does not come with associated contractual framework
  - solves only a tiny fraction of the problem
- Option 4 - extend DCLF ICRP to elements of distribution
  - looks like DNO or DSO Agency model if it did
  - does not come with associated contractual framework
- Option 6 - separate transport and tariff models
  - agree with consistent liability concept
  - but retains arbitrary embedded benefit
  - still leaves residual charge to allocate non-discriminatorily
  - prospect of negative demand tariffs

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Options (3) - Agency Models

- In principle, all the Agency models provide a sustainable solution to distributed generation
  - But, DSO model probably inappropriate and disproportionate:
    - 14 new SOs and BMs or National Grid SO to manage 132kV
    - Requires primary legislation
    - Vast change to contractual frameworks
  - We like the DNO model, but it is difficult
  - Supplier Agency model preferred

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DNO Agency - “DNO TEC”

- Advantages
  - Simple Conceptually
  - Physical alignment
  - Interconnector model
  - Generation treated equally
  - Clear operational interface
- Disadvantages
  - How manage BM interaction?
  - New role for “active DNO”
    - price control re-opener
    - incentives
    - conflict of interest?
  - Methodology to pass transmission charges to Suppliers required
  - How does DNO TEC interact with GB queue?
  - Not just one way - DNO TOC?
  - Double counting to charge Suppliers for demand and a TEC value
  - Gross v Net
  - Max. export not at system peak

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Supplier Agency Model

- National Grid preferred solution

- Minimum level of reform to address EG
- Delivers many benefits
  - formally confers rights to export from GSPs to Suppliers (aligns with rights to offtake)
  - provides consistent liability across generation
  - cost reflectivity delivered by including distributed generation in DCLF ICRP model
  - provides options for clear operational interface

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Supplier Agency Model (SAM) Principles

- Generation to be treated equally whether transmission or distribution connected
    - Need to establish threshold
    - 100kW (HH metered)/1MW, 5MW, 10MW, 50MW?
    - HH may be simplest and most sustainable
- Suppliers would be given zonal export rights (not nodal TEC) for unlicensed embedded generation
- Suppliers would be charged/ receive generation TNUoS for MW installed embedded generation through current charging routes
- Indirectly exposes unlicensed embedded generation to the transmission cost/ benefit of a location decision
    - assumed Supplier pass through

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SAM Charging Process - how could it work?

- Establish installed EG capacity at each GSP node
- Three ways to do it:
  - supplier provides information
    - lowest cost solution
    - Can suppliers provide GSP nodal information?
  - IS changes to SVA settlement system
    - access to HHd, NHHd & HHg metered data
  - Sub-BMU for unlicensed embedded generators?
    - operational benefits/ visibility
- Include EGs in DCLF ICRP model
  - may require information from DNOs to map EGs to nodes
  - must be able to accurately net EG from metered demand
- Charge/ pay Suppliers according to current charging methodology

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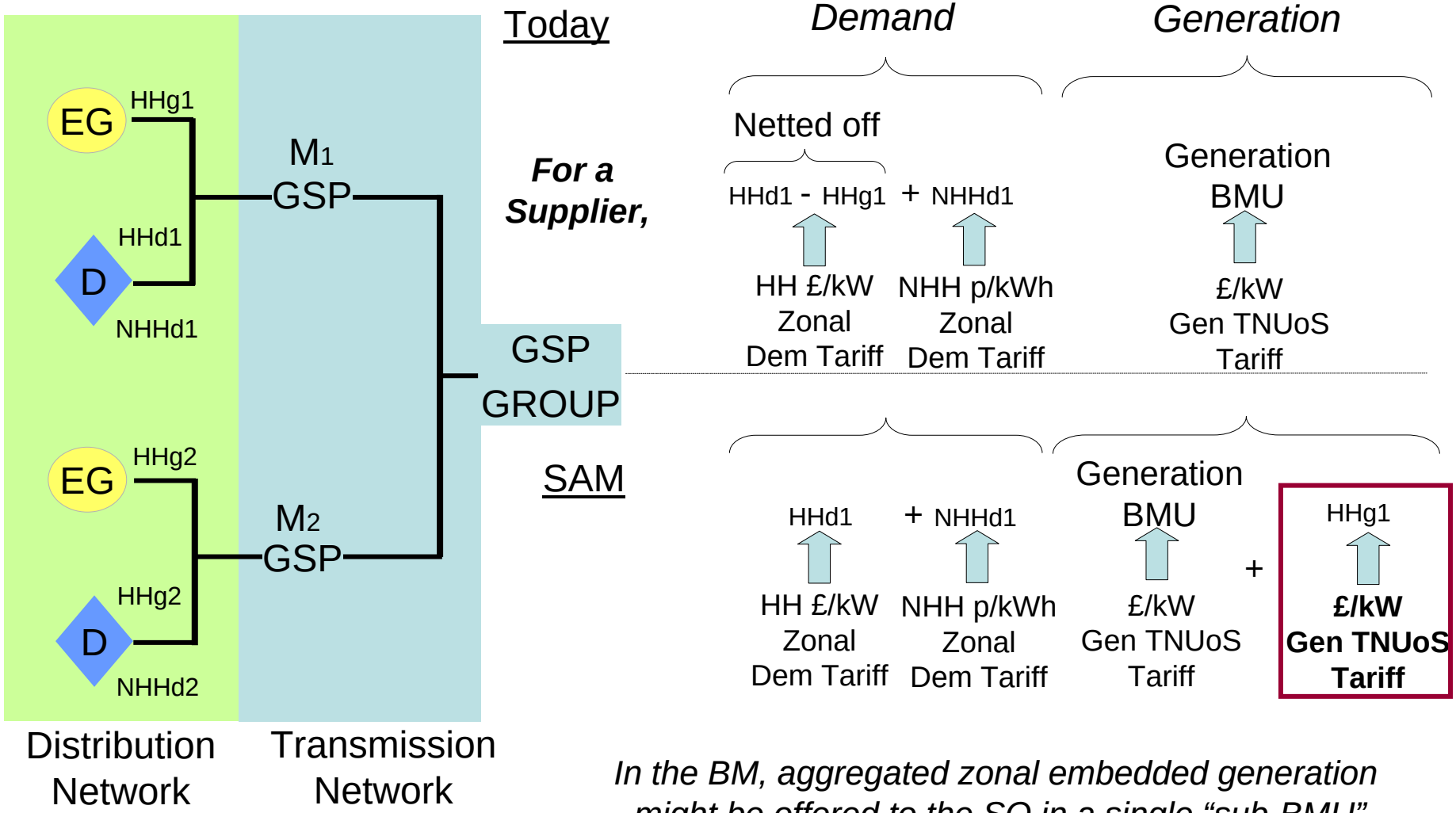
Supplier Agency Model (SAM) - XMW Metered



In the BM, aggregated zonal embedded generation might be offered to the SO in a single "sub-BMU"

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Supplier Agency Model Benefits

- Removes discrimination
- Removes perverse incentives to embed
  - exposure to cost reflective charges
  - more efficient National Grid investment
- Maintains Supplier interface
- Sustainable
- Creates commercial avenue to manage operational issues
- Larger generation charging base, therefore potential for lower average generation tariffs

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Indicative Effect on Transmission Tariffs (1)

- Provisional simple analysis undertaken to estimate effect of including EG in charging model
  - EGs (>1MW) mapped to GSP nodes by postcode (730 sites, 6.9GW)
  - Assumption that flows will not change e.g. DNO assumption within demand forecasts are retained
  - No re-zoning

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Indicative Effect on Transmission Tariffs (2)

- In principle, would expect little change to differentials as EG presently modelled in demand
- Differences may appear due to assumptions over generating capacity of embedded generation at system peak or;
    - Effects within the model e.g. scaling and zonal weighting
    - National Grid knowledge of embedded generation incomplete?
    - effects of <1MW generation?
- Treatment of EG in SQSS may evolve with greater visibility

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Indicative Generation TNUoS Tariffs

		LOCATIONAL				LOCATIONAL + RESIDUAL			
Zone No.	Zone Name	2005/6 Locational Zonal Tariff (£/kW)	Embedded Locational Zonal Tariff (£/kW)	Difference	As %	2005/6 Zonal Tariff (£/kW)	Embedded Zonal Tariff (£/kW)	Difference	As %
1	Peterhead	14.906	14.955	0.049	0.3%	18.162	17.907	-0.255	-1.4%
2	North Scotland	17.673	17.376	-0.297	-1.7%	20.930	20.328	-0.601	-2.9%
3	Skye	19.839	19.807	-0.032	-0.2%	23.095	22.759	-0.336	-1.5%
4	Western Highland	15.664	15.320	-0.344	-2.2%	18.920	18.272	-0.648	-3.4%
5	Central Highlands	12.104	12.027	-0.077	-0.6%	15.361	14.979	-0.381	-2.5%
6	Cruachan	12.596	12.595	-0.001	0.0%	15.853	15.547	-0.305	-1.9%
7	Argyle	10.185	10.530	0.345	3.4%	13.442	13.482	0.040	0.3%
8	Stirlingshire	9.354	9.420	0.066	0.7%	12.611	12.372	-0.239	-1.9%
9	South Scotland	8.564	8.571	0.007	0.1%	11.820	11.523	-0.297	-2.5%
10	North East England	4.834	4.840	0.006	0.1%	8.091	7.792	-0.298	-3.7%
11	Humber, Lancashire & SW Scotland	1.650	1.688	0.039	2.3%	4.906	4.640	-0.266	-5.4%
12	Anglesey	2.866	2.921	0.055	1.9%	6.123	5.873	-0.250	-4.1%
13	Dinorwig	5.449	5.503	0.055	1.0%	8.706	8.456	-0.250	-2.9%
14	South Yorks & North Wales	-0.137	-0.098	0.038	27.9%	3.120	2.854	-0.266	-8.5%
15	Midlands & South East	-1.934	-1.931	0.003	0.1%	1.323	1.021	-0.302	-22.8%
16	Central London	-8.969	-8.539	0.430	4.8%	-5.712	-5.587	0.126	-2.2%
17	North London	-3.477	-3.491	-0.014	-0.4%	-0.220	-0.539	-0.319	-144.7%
18	Oxon & South Coast	-3.956	-4.040	-0.084	-2.1%	-0.699	-1.088	-0.389	-55.7%
19	South Wales & Gloucester	-5.809	-5.792	0.018	0.3%	-2.552	-2.839	-0.287	-11.2%
20	Wessex	-8.208	-8.179	0.029	0.4%	-4.951	-5.227	-0.276	-5.6%
21	Peninsula	-11.302	-11.079	0.223	2.0%	-8.045	-8.127	-0.082	-1.0%

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Indicative Demand Charges

LOCATIONAL → | LOCATIONAL + RESIDUAL →

Zone No.	Zone Name	2005/6 HH Locational Zonal Tariff (£/kW)	Embedded HH Locational Zonal Tariff (£/kW)	Difference	As %	2005/6 HH Zonal Tariff (£/kW)	Embedded HH Zonal Tariff (£/kW)	Difference	As %
1	Northern Scotland	-12.773	-13.220	-0.45	3%	0.000	0.000	0.000	
2	Southern Scotland	-7.072	-7.182	-0.11	2%	4.073	2.723	-1.350	-33.1%
3	Northern	-3.792	-3.878	-0.09	2%	7.353	6.026	-1.326	-18.0%
4	North West	-0.049	-0.239	-0.19	388%	11.096	9.665	-1.431	-12.9%
5	Yorkshire	-0.004	-0.153	-0.15	3667%	11.141	9.752	-1.389	-12.5%
6	N Wales & Mersey	0.024	-0.023	-0.05	-195%	11.169	9.882	-1.287	-11.5%
7	East Midlands	2.280	2.237	-0.04	-2%	13.425	12.142	-1.283	-9.6%
8	Midlands	3.841	3.760	-0.08	-2%	14.986	13.665	-1.321	-8.8%
9	Eastern	2.842	2.761	-0.08	-3%	13.987	12.665	-1.322	-9.5%
10	South Wales	7.130	6.993	-0.14	-2%	18.275	16.897	-1.378	-7.5%
11	South East	4.803	4.554	-0.25	-5%	15.948	14.459	-1.489	-9.3%
12	London	7.331	7.274	-0.06	-1%	18.476	17.179	-1.296	-7.0%
13	Southern	6.647	6.570	-0.08	-1%	17.792	16.475	-1.318	-7.4%
14	South Western	9.304	9.316	0.01	0%	20.449	19.220	-1.228	-6.0%

Larger charging base reduces overall demand charges

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Issues for resolution + Next Steps

- Deminimus threshold
  - what is deemed to be using transmission?
- Embedded generation potentially bypasses capacity queues
- Potential interaction with “User commitment”
- Gauge industry thoughts on viability of proposals
- Ofgem conclusions in February
- Bring forward CUSC/BSC/Charging Modifications

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